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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 22, 1936

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The Weekly Summary of



Current Science

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Edited by WATSON DAVIS

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DO YOU KNOW?

The birds known as gannets dive after fish, even to a depth of 90 feet.

It has been figured that tourist trade at Niagara Falls is a larger financial item than the full power resources of the Falls would amount to.

White painted fingernails were fashionable in Egypt, 1150 B.C.

The world record for cold is 90 below zero, Siberia; the United States' lowest record is only 66.

Recent experiments in Holland are designed to find out how the shaping of artificial teeth may alter voice quality.

Delicately as they are made, pollen grains become fossilized so perfectly that botanists can study the structure of pollens thousands of years old.

Exploring an Indian rock shelter in Kentucky, archaeologists recently found Indian looms, bed clothes, an Indian baby pacifier, and other articles.

A zoologist finds that about 8,000 species of animal life have been recorded in Palestine.

One tadpole in a million may be an albino.

Britain's new super-liner will have a fleet of all-steel lifeboats driven by Diesel engines.

Earliest thermometers for taking a patient's temperature were crude affairs devised in the sixteenth century.

To study natural lightning, engineers of the General Electric plant at Pittsfield, Mass., have erected a lightning observatory.

Red has been made the color of the German post service, all mail boxes, trucks, collecting vehicles, and busses used being painted cadmium red.

Naturalists are puzzled to find porcupines above the timber line in Rocky Mountain National Park, Colorado, where ordinary porcupine diet of bark and cambium is absent.

A temple that Cleopatra built in honor of her son Caesarion at Armant, Egypt, was destroyed in 1861 and the materials used in building a sugar factory.

WITH THE SCIENCES THIS WEEK

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ZOOLOGY

Where are wolves becoming a menace? p. 120.

MEDICINE-SURGERY

Adam and Eve Operation Saves Thousands From TB Deaths

Removal of Parts of Ten Ribs and Other Methods For Allowing Chest to Collapse Rest Affected Lung

THE newest methods of treating tuberculosis, including a sort of Adam and Eve operation in which not one rib but parts of ten ribs are removed, were described by Dr. James Alexander Miller, professor of clinical medicine at Columbia College of Physicians and Surgeons, at the University's alumni day celebration.

The Adam-like rib operation, known medically as thoracoplasty, and the other methods described by Dr. Miller have already saved thousands of lives and materially shortened the period of treatment for tuberculosis patients, Dr. Miller reported.

"Collapse therapy is without doubt the greatest advance that has been made in the treatment of pulmonary tuberculosis within a generation," he declared.

Collapse therapy is the group name for the four procedures Dr. Miller described. The principle is that of "placing the affected lung under conditions of rest and collapsing cavities which may have formed."

The method is suitable in about 40 per cent.—nearly half—of all cases under treatment. These cases are the ones which in the old days would have been classed as chronic incurable cases with "nothing but permanent invalidism or slow death to be anticipated." About thirty-five to forty per cent. of these patients are now returned to active normal life.

Rest cures in conjunction with collapse therapy are still important, Dr. Miller pointed out, but climate and forced feeding are no longer the important parts of tuberculosis treatment that they once were. At Bellevue hospital some three hundred tuberculosis patients are getting the new form of treatment, and about one-third of them are working and leading a fairly normal life and most of them have never been out of the lower East Side of New York.

"Collapse therapy" is applied in four different ways. Dr. Miller described them as follows:

"First and most important is what is known as artificial pneumothorax which

consists of introducing air into the pleural cavity surrounding the lung, thus compressing the lung slowly by frequent and repeated injections which must be continued over a long period of time, usually several years.

"The second method is a complement of the first. This is known as pneumolysis or the cutting of adhesions which may bind the lung to the chest wall. The presence of these adhesions is the chief hindrance to successful collapse therapy by artificial pneumothorax and in certain cases absolutely interferes with its successful use. In others the interference is only partial and in such cases by the introduction of a very delicate instrument into the chest cavity, these adhesions may be cut and the lung consequently released from the chest wall and the cavities successfully closed.

"The third method of treatment is what is known as phrenicectomy. That is the division of the phrenic nerve which controls the diaphragm, the muscle between the chest and the abdomen, which is the most active muscle in the act of breathing. It is found that by cutting the nerve in the neck and paralyzing that half of the diaphragm, the relaxation and lack of movement thus obtained will in a certain number of cases allow the lung to retract and close the cavity in that way.

"The last and perhaps most spectacular method of treatment is surgical and involves a major operation known as thoracoplasty. By this method sections of all of the fixed ribs, ten in number, are taken out in successive operations, the chest wall allowed to collapse in, and in that way the cavities are closed and the activity of the disease controlled. This method is used in cases where artificial pneumothorax is impossible or only partially successful. The technical difficulties have been largely surmounted so the mortality from this operation now is very small. Moreover, the amount of incapacity and deformity which one might theoretically expect as a result of such a formidable-appearing operation is much less than one might think."

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ROYAL SPORT

This 16th century Persian miniature painting recently added to the Oriental Collection in the Freer Gallery of Art, Washington, D. C., who furnished the photograph, shows how polo was played in days gone by.

ARCHAEOLOGY

Polo Was Sport of Kings, Veiled Ladies Played, Too

POLO was sport of kings in Persia, over three hundred years ago. Popularity of the fast riding game spread through Asia from Japan to Baghdad, and even veiled ladies had their own sprightly polo matches on the field.

This romantic old chapter in sport history is revived through addition of two polo scenes in Persian miniature painting to Oriental collections in the Freer Gallery of Art, of the Smithsonian Institution.

The beautifully colored paintings illustrated a Persian manuscript poetically treating of "The Ball and Mallet."

Verse accompanying the pictures admiringly describes the King Muhammed playing polo on a scale not merely royal but god-like, with the moon for his ball, heaven for his polo field, and such skill and swiftness that his pony would "overshoot the goal of heaven" if he did not restrain it.

Persia is not believed to have invented polo. But the game won high favor there, and supposedly spread thence to western Europe and later to America.

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PHYSICS

Matter In Cores of Atoms Found to be Closely Packed

If Human Fist Had the Same Density as the Atom Heart It Would Weigh a Million Times a Million Tons

THE NUCLEI or cores of atoms are composed of such dense matter that if the human fist were packed as tightly with matter it would weigh a million times a million tons, declared the Danish Nobel prize-winning scientist, Prof. Niels Bohr, at the University College lecture, London.

It is this close packing of the hearts of atoms which is proving puzzling to scientists, said Prof. Bohr, for the structure and behavior of atom nuclei are governed by laws quite different from those already known for atoms as a whole, or for familiar matter that can be seen or handled.

A possible explanation for the mysterious explosions of atoms which have been observed in studies of cosmic rays might be found, Prof. Bohr suggested, by the impact of particles having energy of perhaps 1,000 million volts. This is a hundred-fold multiplication over the mere 10,000,000 volt energy particles available in laboratories. When the particle "bullets" can be produced hav-

ing the much higher energy, atomic explosions may also be produced in the laboratory. That 1,000 million volt energy particles may be produced is not beyond distant hope, he said.

The nucleus, Prof. Bohr suggested, may be likened to a group of billiard balls lying on a circular table with low cushions. If some external ball is shot into the group there starts a series of mutual collisions which may cause the capture of the impinging ball. Such a capture explains the creation of the super heavy element No. 93 by the Italian physicist Dr. Enrico Fermi.

Another possibility, Prof. Bohr pointed out, is that if the balls keep colliding there is a possibility that one of them will collect enough energy to jump the barrier and go off the table. This situation could be likened to the experiments on artificial radioactivity performed first by the latest Nobel prize-winners, Irene Curie Joliot and her husband, M. Joliot.

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ASTRONOMY

Twenty Billion Years Held Maximum Age of Universe

THE universe is not so old after all! Flatly contradicting Sir James Jeans' figure of ten million times a million years for the age of the universe, Dr. Bart J. Bok of the Harvard College Observatory has found that number approximately five hundred times as high as it should be.

Twenty billion years is the upper limit of the age of the universe, as viewed by Dr. Bok. Jeans' long time scale does not fit with the evidence of star clusters, with the known facts of the rotation of the Milky Way system or with the existing theories of the creation of the spiral nebulae. Nor does it explain the existence in the same star cluster of "young" red giant stars and

of "old" dwarf stars.

"The giants with their tremendous energy output can hardly have existed for much longer than ten billion years, unless we wish to make the as yet unfounded hypothesis that the energy radiated away is being replenished in some unknown fashion from surrounding space," Dr. Bok said.

"We found it unlikely," he concluded, "that the observed clusters have existed for more than twenty billion years as groups of stars. Lemaître's theory of the expanding universe indicates that a catastrophe took place a few billion years ago, and it is tempting to place the origins of the stars and stellar systems at the epoch of this catastrophe."

Hundreds of star clusters, including the well known Pleiades, Hyades, and Taurus, would now be on the verge of disintegrating all at once, torn apart by the gravitating forces of the Milky Way, if they had been in existence as long as Jeans believes, Dr. Bok has found.

"In the course of their development these clusters must have wandered through widely different parts of our galaxy, but in spite of this, under Jeans' long time scale we would find them ready to disintegrate, cosmically speaking, simultaneously," he said. "In other words if we were to take our observations at a future epoch removed from the present by only half a per cent. of the total supposed age of our galaxy, no sign of them would be left."

"It seems absurd to assume that several hundred clusters, all of which had presumably considerable mass and density at the time of their birth, would be observed simultaneously on the verge of disintegration in a galaxy for which the conditions that determine the rate of disintegration will be apt to vary from point to point."

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PUBLIC HEALTH

Showers Won't Prevent Throat Infection Spread

SHOWER baths required before swimmers are allowed to enter pools are not enough to prevent the spread of the streptococcus infections of nose and throat, which so commonly develop among those who use pools regularly, W. B. Ardrey of the Michigan State College told the Society of Bacteriologists, Pathologists and Allied Workers.

Mr. Ardrey found that when examinations were made of the skin at various parts of the body, streptococci were found in very small numbers except on the hands, and that when swabs were made of the mouth and nose, tremendous numbers of these "germs" were discovered.

Bathers were instructed to take their usual baths before entering the pools and then to stay at the shallow end of the pool and wade around. Few or no streptococci were found in the water until the bathers were told to swim and take exercises which placed their mouths and noses under water. Bacterial counts then made of the swimming pool water showed large increases in streptococci. This was explained on the basis that some water enters the nose and mouth and is immediately blown out again.

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NEW HAZARD

This is what happened when the first explosion occurred in a soybean industrial plant.

CHEMICAL ENGINEERING

Soybean Explosions
New Industrial Hazard

THE SOYBEAN is repeatedly in the limelight these days.

What with the United States growing a bumper crop of the Asiatic beans, and farmers and industrial companies launching out into new projects to make the most of them, the soybean situation is, as the market journals might say, "lively."

But with new opportunities, appears a new hazard: soybean plant explosions.

Last October 7, without warning, came the first explosion in a soybean industrial plant. Eleven men died, 45 were injured, when a Chicago processing plant handling 4,000 bushels of soybeans a day was badly wrecked. So violent was the explosion that approximately 500 homes and business houses were damaged by flying debris and by the shock.

Within the same month, a rural soybean unit in Illinois suffered a similar disaster. This soybean oil extraction plant had been installed to enable farmers of the community to utilize their soybean crop to better advantage. A swift, disastrous chain of events—fire, ignited solvent vapors, explosion—left two men dead and two injured.

Before this second explosion occurred, chemical engineers of the Bureau of Chemistry and Soils of the U. S. Department of Agriculture had already gone into action. Dr. David J. Price, the department's chief investigator of these problems, and his assistant, Hylton R. Brown, inspected the ruins, and gave their verdict:

Caused by Hexane

Both disasters, judging by the ruins, started when hexane vapors became ignited. Hexane is a flammable liquid used as a solvent in extracting the soybean oil. In the industrial plant an accumulation of the explosive hexane gas was ignited by a minor dust explosion near a flaking roll in the bean preparation room. In the rural unit the heavy hexane vapors settling in the extraction room apparently were carried over through an open door to the fire in a nearby boiler room and were ignited in the fire box.

Dr. Price believes in preventive treatment for such disasters. He is busy now warning farmers and manufacturers in the soybean industry to follow the safety codes for protecting against other explosive dusts. (Turn to Next Page)

MEDICINE

Germinated Barley Yields
Diabetes Remedy Like Insulin

A SUBSTANCE akin to insulin, which may prove useful not only in diabetes but also in helping to gain weight, has been obtained from germinated barley by two French scientists, Drs. E. Donard and H. Labbé of the Faculty of Medicine of Paris.

Insulinoide of germinated barley — I. G. B. for short — is the name Dr. Labbé gives the substance in his report. (*Canadian Medical Association Journal*, Feb.)

Valuable as insulin is, Dr. Labbé points out, it has certain disadvantages and can only be used under the careful guidance of a physician. For this reason, almost as soon as insulin had been discovered scientists tried to find whether certain vegetable cells, like those of the animal pancreas, had the power to secrete substances with properties like those of insulin but which would at the same time be "less dangerous to apply and easier to manipulate."

One of the first to work on this prob-

lem was Prof. J. B. Collip of McGill University, Montreal, who discovered a "glucokinine hormone" in vegetable tissues. Other investigators tried the effects of various plant extracts, among them whortleberry tea and bean pod extract.

The barley insulinoide prepared by Drs. Donard and Labbé has been tried on animals and human patients by themselves and by colleagues at the Hospital Saint-Louis of Paris. In diabetes the preparation reduces the high sugar content of the blood and relieves other symptoms, Dr. Labbé reports. Its use, he states, seems to be absolutely justified for fattening cures for underweight people.

"Of course," he adds, "only long experience will tell if, while being much less dangerous to handle than insulin, insulinoïdes and particularly the I.G.B. will produce gently and continuously the desired effects on the recovery of the general nutrition."

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Dr. Price also urges that non-flammable solvents be sought, to replace liquids such as hexane, the vapors of which ignite easily. If flammable stuff must be used, then he advises some instrument must be evolved to ring an alarm or speed up fans when vapors begin to escape in dangerous concentrations.

"We don't want to discourage the installation of plants for soybean proc-

essing," says Dr. Price. "We do want to urge 'safety first.'"

"There appears to be rapid advancement in methods for extracting oil from soybeans. And since soybeans can be used in so many processed products—from ice cream cones to rabbit feed, and from glue to plastics—the problem of explosions in soybean plants will obviously have to be met, not avoided."

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CHEMICAL ENGINEERING

Sandy Soil Turned Solid by Injection of Chemicals

TURNING porous sandy soil into solid rocklike material with the texture of medium hard sandstone is the latest technique by which European chemists are now strengthening subway tunnels, improving hazardous foundations of buildings, plugging leaks in the beds of streams of valuable mineral springs and restoring underwater dams.

The system, known as the Joosten process of soil solidification, consists of injecting into the soil two chemical solutions which combine to form a gel-like material.

The gel material has a high surface tension and acts to draw the sand particles closely together. Loads of 1,100 pounds to the square inch are successfully withstood by the artificially solidified sandy soil.

Applications of the new method are many. The Cathedral Church of Ribe in Jutland rested on closely packed chunks of rock lying on a bed of fine sand. In the course of years, and due in part to increasing nearby motor truck traffic, the foundations subsided and cracks appeared in the masonry.

Menace Removed

Underpinning the walls with girders was deemed inadequate. It was decided to widen the foundation by means of chemical solidification in the underlying sand layer. The operation was so successful that the menace to the cathedral structure no longer exists.

In connection with recent construction on London's subway system the method was also tried successfully. Injection pipes for the chemicals were driven through the planking used to line the finished part of the tunnel. A chemically solidified arch of smooth gravel was formed in the tunnel's roof.

When it came time to cut away parts of the roof which projected into the tunnel profile, pneumatic chisels had to be used because of the strength of the material.

Moreover, the process has been used to plug leaks in a stream of valuable medicinal waters at Teplice-Sanov in Czecho-Slovakia near the Austrian border. The stream bed consisted of sand and silt lying on top of a sandstone layer. Cracks developed in the sandstone and the valuable waters were leaking away.

By putting down injection pipes the chemicals were turned into the sand and silt and brought about successful solidification.

Two Chemicals

The two solidifying chemicals are reported to be silicic acid, which is put into the sandy soil first, and an unnamed salt solution that immediately reacts with the silicic acid to form an insoluble colloidal silicic acid gel. For successful operation a careful study must be made of the soil type and use confined to sandy layers. The technique will not work for clay or mud.

The process of the solidification of sandy soil by the injection into it of two chemicals may find usefulness in the movement for improvement of the secondary, "farm-to-market" roads of the United States, officials of the Highway Research Board in Washington, D. C., indicated when they were told of the German experiments.

The methods of keeping roads in sandy soil from water erosion in wet weather and wind erosion in dry weather are ever-present problems. If research in America can confirm the claim

that the sandy soil can be turned into a solid material like medium hard sandstone, the technique should be useful. The question of cost, now undetermined, would be a necessary consideration.

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GENERAL SCIENCE

New Buildings For Soviet Academy of Sciences

CONSTRUCTION of the new buildings of the U.S.S.R. Academy of Sciences will be started this year. A total of nearly 500 acres of land will be needed. Plans just announced indicate that the buildings will be erected on a huge scale.

Largest building and center of the group will be built on an area of 83 acres. Here will be located the Presidency of the Academy, and the departments of Social, Mathematical and Natural Sciences. Also included will be all museums and the Central Library.

Living quarters for the scientific workers will occupy 35 acres while a neighboring plot for the genetic and physical sciences will cover 67 acres.

The chemical, biological and the genetics institutes, the publishing house of the Academy and more staff dwellings will occupy an area of 270 acres.

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CHARLES MARTIN HALL

When he was only 22 years old, he discovered the process for making aluminum.

METALLURGY

Honor Discoverer of Cheap Process For Aluminum

THE 50th anniversary of the discovery of the cheap process for producing aluminum and the start of a successful aluminum industry, was celebrated at a dinner of the Electrochemical Society on February 17. The actual discovery dates from February 23, 1886. The inventor was Charles Martin Hall, young graduate of Oberlin College.

It was Hall's discovery which lowered the cost of aluminum from \$500 and more a pound, as it was at one time, to 20 cents a pound.

Aluminum, if it was to be had at all, was quoted at \$545 a pound just before the Civil War. In 1879 an American purchased a pair of opera glasses in Paris and the jeweler offered an aluminum or platinum setting at about the same price. The purchaser took aluminum, and lived to see aluminum used for pots in his kitchen and sold in the 5-and-10-cent stores.

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MEDICINE

\$10,000 Prize Offered For Relief or Cure of Disease

A PRIZE of more than \$10,000 will be awarded in 1940 and every seven years thereafter by the American Academy of Arts and Sciences in Boston for "outstanding work with reference to the alleviation or cure of diseases affecting the human genital organs." The award is to be known as the Francis Amory Septennial Prize, since it is made possible by a fund established by the will of the late Francis Amory of Beverly, Mass.

In case there is work of a quality to warrant it, the first award will be made in 1940. It rests solely within the discretion of the Academy whether an award shall be made at the end of any given seven-year period, and also whether on any occasion the prize shall be awarded to more than a single individual or research program.

No Essays

While there will be no formal nominations, and no formal essays or treatises will be required, the Committee invites suggestions, which should be made to the Amory Fund Committee, care of the American Academy of Arts and Sciences, 28 Newbury Street, Boston, Mass.

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**HISTORIC BITS**

This treasure chest holds the little globules of aluminum that were made just 50 years ago by Charles Martin Hall, the first made by the electrolytic process he discovered. The large globule at the right is from the first run made by this process in 1888 by the Pittsburgh Reduction Company.

PHARMACOLOGY

Synthetic Drugs on Increase, New Pharmacopoeia Shows

INCREASING use of synthetic chemicals to treat disease is seen in the pages of the new U. S. Pharmacopoeia, by Dr. Arthur Osol, associate professor of chemistry at the Philadelphia College of Pharmacy and Science. The new Pharmacopoeia, representing the eleventh revision, will become the legal standard for drugs in this country on June 1, 1936.

"It is evident that the medical profession is becoming synthetic-chemical minded," Dr. Osol said, after analyzing the new drugs and their standards as given in the new Pharmacopoeia.

Of 58 articles added to the eleventh revision, 28 are organic chemicals, mostly synthetic in origin. There are three inorganic chemicals and the remainder of the 58 new articles includes oils, serums, toxins, antitoxins, vaccines, tablets and solutions. For example, the synthetic forms of two old stand-bys, cam-

phor and menthol, are admitted to the eleventh revision.

Of the 119 articles not admitted to the eleventh revision, only 16 are organic chemicals, mostly alkaloidal salts; 9 are inorganic chemicals and the rest are chiefly fluid-extracts, solutions, pills, syrups, tinctures, troches and ointments.

An important new feature of the eleventh revision of the Pharmacopoeia is the inclusion of a section on hydrogen ions and hydrogen ion concentration, since this deals with the quantitative expression of the acidity of solutions.

Of special value to the research worker and the student is the inclusion of structural formulas for the various chemicals listed in the Pharmacopoeia. These formulas, Dr. Osol explained, are true pictures of the chemical compound, based on its chemical behavior.

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ZOOLOGY

Wolves Menace Alaska Reindeer; Aid Asked

WOLF fighters, skilled in warfare against these voracious pack-hunting beasts, are asked for in an emergency wire from Governor John W. Troy of Alaska, received at the Department of the Interior.

Because of the severity of the winter, vicious gangs of wolves have been raiding the reindeer herds owned by natives of northern Alaska, threatening to undo the work of years in raising their standard of living and teaching them the ways of civilization.

Native hunters have proved unable to cope with the animals, but it is believed that about four hunter leaders, each with a few assistants, could in a swift campaign break up the marauding bands.

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PHARMACOLOGY

Doses Will Taste Better After Formulary Changes

BETTER-tasting medicines will apparently be one result of changes in the National Formulary, which might be called an official recipe book for pharmacists. The changes embodied in the sixth revision of this volume, which becomes official on June 1, 1936, were explained by Dr. Adley B. Nichols, secretary of the National Formulary committee on revision, at a conference at the Philadelphia College of Pharmacy and Science.

The National Formulary—known as N.F. for short—is a companion to that other legal standard for drugs in the United States, the U. S. Pharmacopoeia. The latter includes drugs and remedies of proven efficacy, regardless of whether they are widely used or seldom used. Products are included in the N.F., on the other hand, on the basis of how generally they are used, Dr. Nichols pointed out.

In the present revision 321 items were dropped from the book because survey of over a hundred thousand prescriptions, collected from all parts of the country, showed that these items were not used in actual practice. A total of 233 new items were admitted.

Six glandular products were admitted, namely, corpus luteum, ovary, ovarian residue, anterior pituitary, whole pituitary and suprarenal.

Salty-tasting medicines such as the

bromides should taste better because syrup of raspberry is the official "vehicle" for these preparations. The resulting effect is like adding a pinch of salt to bring out the flavor of the syrup.

Syrup of acacia is another new vehicle which makes disagreeable medicines pleasant to take because the colloidal action of the acacia keeps the medicine from coming in contact with the taste buds on the tongue.

Syrup of cherry is another new addition which has been widely acclaimed.

"Its specific value lies in its fruity tartness which makes it a delightful mask for sour products such as the diluted acids, where the acid almost enhances the taste rather than destroys it," Dr. Nichols says.

For a change, pharmacists are advised to use syrup of thyme, which has "a markedly different taste."

A valuable feature of the new N.F. is the addition of many dental products. Among these is aromatized sodium perborate. Because this is now so widely used by laymen without specific directions from a dentist, pharmacists are advised to caution customers about its promiscuous use.

"It has been the cause of severe mouth burns when used as a powder which lodges in cavities and eventually hydrolyzes to sodium hydroxide."

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PUBLIC HEALTH

Septic Sore Throat Traced to Raw Milk

MANY cases of septic sore throat are directly attributable to drinking raw milk from infected cows, C. S. Bryan of the Michigan State College told the members of the Society of Bacteriologists and Pathologists and Allied Workers of Michigan, Indiana, and Ohio.

Investigation shows that as high as four-fifths of herds tested, which supplied one large city with milk, were infected. In some herds only one cow had streptococcic mastitis, but as high as 26 per cent. were involved. These infected cattle constitute a grave menace to public health because of the contagiousness of the infection.

From the standpoint of the farmer these cattle are also of little value, the speaker pointed out, for such infected cattle produce 22 per cent. less milk and their butter fat production is reduced 24 per cent.

Science News Letter, February 22, 1936

IN SCIENCE

MEDICINE

Animal Blood Transfused Into Human Patients

EXPERIMENTS in transfusion of blood from goats, bulls and hens into human patients are being carried on by a number of Soviet scientists. The object of these transfusions is not to replace blood lost in accident or disease, as in the case of transfusions of human blood, but to stimulate the body to greater activity in fighting off disease.

Stomach ulcer, certain forms of rheumatism, various forms of blood poisoning and chronic anemia are among the conditions which, it is claimed, may be helped by animal blood transfusion by the method of these Soviet scientists.

The blood from the animals is specially treated in order to make it safe for injection into the human patient's vein. In the case of the bull's blood, only the red cells are used, on the theory that the albumen of the blood plasma, rather than the red cells would prove most incompatible with human blood and therefore most injurious.

This is the explanation given by Prof. Galpern of the Dniepropetrovsk Medical Institute, who is said to have been the first to make experimental transfusions of large doses of animal blood to men. Similar transfusions have since been made by Prof. N. A. Dogoraz of the Rostov Medical Institute.

Science News Letter, February 22, 1936

ASTRONOMY

Small Telescope Takes Photo of Planet Pluto

PLUTO, ninth planet of the solar system, discovered in 1930, can now be observed with relatively small telescopes, it is indicated in reports from Poland received at the Harvard College Observatory.

Photographs of two hour exposure taken with a special Zeiss 4¾ inch photographic telescope by K. Steins of Riga in Latvia showed the tiny planet distinctly. Heretofore the planet has been observed only with large instruments.

Science News Letter, February 22, 1936

WILDERNESS FIELDS

ANIMAL HUSBANDRY

Porcupines Cause Death Of Many Colts and Calves

PORCUPINES must face the charge of killing large numbers of colts, calves and sheep, in addition to their already standing indictment as destroyers of trees, the U. S. Forest Service states.

It all comes about through the habit of all young animals, of sniffing inquisitively at any strange object they see. They touch "porky's" quills, which are very loosely attached, or get a handful of them flicked into the sensitive nose tissues by a nervous flick of the animal's bristling tail. There ensue weeks of misery, and finally death.

"Porky's" sins against young timber are the result of his appetite for juicy bark. He climbs up six or eight feet into a young tree and "gnaws him a meal," working round and round the trunk and completely girdling it, so that the tree dies. Porcupines are "Timber Enemy No. 2" in parts of the West, foresters declare; they are responsible for the destruction of more trees than any other cause except fire.

Science News Letter, February 22, 1936

SURGERY

Urges Quick Amputation Of Badly Crushed Limbs

EARLY amputation of limbs which are severely crushed, as they often are in traffic accidents, is nearly always the safest course.

First advocated many years ago by Dr. Harvey Cushing, famous American surgeon and neurologist, this belief is convincingly reaffirmed by Dr. Lotfy Abdelsamie, late Resident Surgeon of the Kasr-el-Aini Hospital, Cairo. (*The Lancet*, Jan. 25).

The reluctance of many surgeons to operate immediately in such cases is quite understandable, Dr. Abdelsamie points out. If the general condition is good, the gravity of the injury may suggest at least a short delay before amputation; while there is plainly a more alarming cause for hesitation if the pulse is bad and the patient generally exhausted. But an extensive series of cases at

the Kasr-el-Aini Hospital has shown that in either instance the risk of death is increased by delay. A good general condition at first is apt to deteriorate rapidly, and a poor initial condition is all the more likely to pass quickly to a fatal issue.

These considerations apply to cases of "severe crushing" of limbs, the conditions being defined by Dr. Abdelsamie to include laceration and extensive stripping of the skin, pulping of the muscles, injuries to important nerves and blood-vessels, and the breaking up of bone into small fragments.

Such cases are now regarded at this Cairo hospital as requiring almost as urgent treatment as hemorrhage. When all operating theaters are occupied the amputation is performed in any room that is available.

In most of the amputations of severely crushed limbs at the hospital local anesthesia is given, in the form of heavy injections of novocaine.

Science News Letter, February 22, 1936

PHYSIOLOGY

Find Cheaper, Easier Way Of Obtaining Vitamin B

ACHEAPER and simpler method of obtaining antineuritic vitamin B from rice polishings has been developed by Prof. Leopold R. Cerecedo, Douglas J. Hennessy, John J. Thornton and Frank J. Kaszuba of Fordham University.

After five years of research, the Fordham chemists have worked out a process which, it is said, eliminates more than half the steps in the older process and does away with the use of the expensive chemicals involved in isolating pure vitamin B.

The main feature of the Fordham process is the use of Permutit, a sand-like substance widely used as a water-softener. Rice polishings are used as the starting material; these are extracted, and the extract is allowed to trickle down through the Permutit. The latter picks the vitamin out of the extract. The vitamin-rich Permutit is then treated with another solution to remove the vitamin, which can then be isolated without the use of costly materials, such as the salts of gold and platinum which have been used in the older processes.

There is only one ounce of pure vitamin in about a ton and a half of rice polishings, so it is easily seen how necessary it is to get a simple and inexpensive method of extraction.

Science News Letter, February 22, 1936

PUBLIC HEALTH

New Low Death Rate For Industrial Population

THE BEST health record and the lowest death rate for the industrial population of the United States and Canada were achieved during 1935, Metropolitan Life Insurance Company statisticians announce.

The death rate for industrial policyholders of this company was 8.4 per 1,000. The death rate for the entire country has not yet been computed. Data from 17 states covering fractional parts of the year indicate that the death rate for 1935 was lower than for 1934 but that the 1933 all time record low of 10.7 per 1,000 was probably not reached.

New low death rates were registered for typhoid fever, tuberculosis, diarrheal conditions, chronic nephritis (kidney disease), diseases associated with childbirth, and burns and drownings, according to the life insurance company's figures.

The lowest alcohol death rate since 1921 was recorded in 1935, the second full year since repeal of national prohibition. The 1935 death rate from this cause was 2 per 100,000, which marks a decline of 13 per cent. in deaths from alcoholism among insured wage-earners.

Small declines in the death rates from cancer and diabetes are encouraging features of the 1935 health picture as seen in the life insurance company statistics.

Fewer suicides and fewer deaths in automobile accidents were recorded for this large group of insured wage earners. Although deaths from automobile accidents probably did not decline in the population of the United States as a whole, the lower death rate from this cause among the industrial policyholders, most of whom live in cities, indicates that such increase as there may have been throughout the country was largely in rural districts.

The effect of liver treatment in reducing deaths from pernicious anemia is also noted in the company's statistical report.

"We can now say with considerable certainty that the use of liver based on the work of Drs. G. H. Whipple, G. R. Minot and W. P. Murphy in 1926 in the treatment of pernicious anemia has resulted in definitely checking the mortality from this disease," states the company's statisticians.

Science News Letter, February 22, 1936

EVOLUTION

Legs

Except For Those Who Deal in Entertainment or Sport
Few Give Thought to the Importance of These Adjuncts

By DR. FRANK THONE

LEGS are something we cannot very well get along without.

The average citizen requires two. Wholesale entrepreneurs of eye-and-ear entertainment, like Mr. George White or Mr. Earl Carroll, lease them in larger quantities. It is not uncommon for them to order up batches of two or three hundred of them, paired, carefully inspected for flaws, and in good running (and kicking) order, complete with the usual accessories. Similar specifications (except in gentlemen's sizes) are sometimes submitted by morose persons in turtle-neck sweaters at such establishments as Notre Dame, Princeton and Stanford. But most of us get along on two legs apiece.

But have you ever considered how lucky you are to have any legs to stand on? How only the elect few, among all creatures of the animate world, have any legs at all? How even fewer, among those who have legs, are equipped with underpinning of such all-round usefulness as those that support the human race—and adorn a fair half of it?

Probably not. So far as a search of the literature discloses, G. K. Chesterton is the only person who has ever thanked Santa Claus "for having put into my stockings a pair of miraculous legs." Most of us just take our legs for granted—blithely disregard them, until we think we have something to kick about. Disregarding the fact that kicking never pays—except in the cases of the aforementioned ladies of the ensemble, and perhaps those gentlemen in the backfield who receive "athletic scholarships." Really, appreciation of legs should extend beyond the first three rows of orchestra seats.

Really Wonderful

Perhaps we might get more of a kick out of having legs if we knew what a deal of trouble has gone into the development of those twin props that take us where we want to go (accidents and

bottles not preventing), or hold us up when we merely want to stand still, with very little thinking on our part. Legs really are miraculous, as G. K. C. termed them; in the old Latin sense of something to be admired, wondered at. And nothing more remarkable about them than the long process of preparation they had to go through, before they were fit to appear on the musical-comedy stage, or the football field, or ourselves personally.

Evolution of Legs

The Santa-Clausian suddenness with which Mr. Chesterton's legs appeared in his stockings was more due to the abruptness of his arrival at an appreciation of their usefulness and beauty, than to any magic with which legs were whisked from non-existence into full and useful being. For just as Santa Claus has to labor all year in his toyshop at the North Pole before he sets forth putting gifts into our stockings, so the slow development of many forms of life had to labor through many geologic ages before legs could be put into our stockings. One of the most fascinating of all the chapters of the great book of Evolu-

tions is the story of the Evolution of Legs.

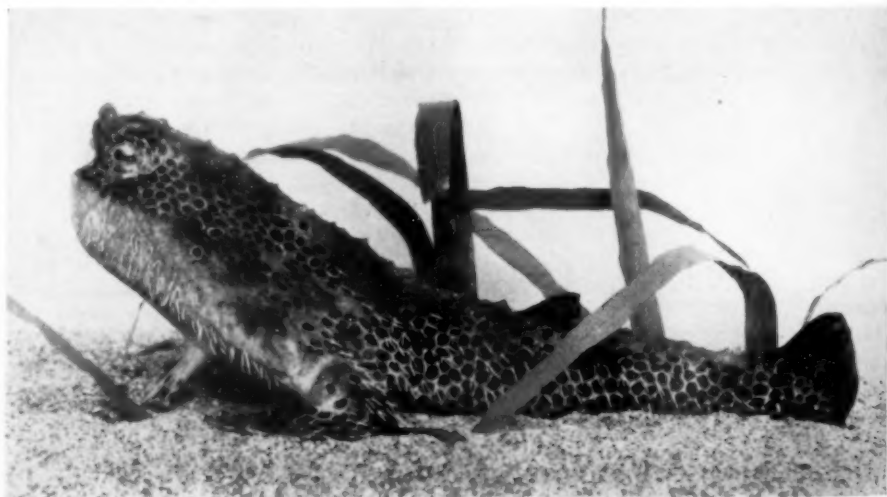
Once upon a time (to start the story as all good stories should start) none of the backboned animals had any legs at all. There weren't any but fish, that swam in the water with fins.

Now if you will look at any ordinary fish, you will see that he has two kinds of fins. On his back like sails, and maybe underneath him like a keel, on the midline of his body, are unpaired fins. Besides these, there are paired fins, one pair forward, near his gills, the other pair aft, about three-quarters of the way back to his tail. They are where his arms and legs would be, if he had any.

These paired fins serve the fish as up-and-down rudders, water brakes, lifters after the manner of an airplane's wings, and perhaps in other ways. They are, quite definitely, implements for working in the water.

For Bottom Walking

Yet out of them developed the beginnings of legs. Some fish are lazy, and like to spend a good deal of time loafing on the bottom. They may not even want to get up and swim when a short distance has to be traversed, but content themselves with wriggling and humping themselves along on the mud or



BEGINNING OF LEGS

Among the fish, there are some like this batfish whose fins are so developed as to serve roughly the purpose "bottom-walking" along the mud and sand of the water's floor.



BEING LOST AGAIN

When the mammal goes back again to the sea as has the walrus pictured here, his legs return again to the fin-like flippers reminiscent of his evolutionary ancestors.

sand. In this "bottom-walking" the paired fins prove themselves useful.

Some fish of this kind come ashore, splashing around in the shallow tide pools or even leaving the water entirely and traveling short distances overland. A few can get along out of the water for fairly extended periods, and clamber up the slanting stems of bushes, hunting for insects. These are the famous tropical climbing perch, about which such remarkable legends of tree climbing have grown up.

Some time in past ages (very long—past ages—350 million years ago at least) some of these shoregoing fish more or less stayed ashore—and vertebrate life on land began. It was not a very proud, high-society kind of life; nothing but some crawling, long-tailed things more or less like our present-day salamanders and mudpuppies. But it did have legs.

Not Steppers

These first things with legs, and also the earliest lizard-like reptiles that followed them, were decidedly not high-steppers. In fact, they could hardly be called steppers at all. All the poor, short, formless, spraddled-out limbs could do was push the animals through the sand and slime, much as their immediate predecessors, the paired fins of

the venturesome fish, had done. We find such primitive legs on amphibians and reptiles still—legs that stick out mostly sidewise, and find it very difficult to get under the body, lift it up, and actually run. The troubles of an angry alligator, which can make a short fast rush on his toes but cannot keep it up, are neatly illustrative of the limitations of this type of legs.

Next the Jump

But it wasn't long before the land animals were able to gather their legs under them, and in a world where "jump quick!" was the rule if you wanted your dinner—or would avoid being some one else's dinner—a large block of the citizenry were quite literally on their toes all the time. It began before the mammals appeared, with quadruped reptiles of all kinds, most conspicuous of course being the monster four-legged dinosaurs. And the mammals in their day have been ever more on their toes. Even the massive-framed beasts like elephants and hippopotamuses stand on their toes—though because of their ponderous body-weight their toes, ankles and legs have to be very thick and strong. When you're as big as an elephant you can't hope for tapering legs and gracefully curved calves. Such things are for gazelles.

The limit of this business of "getting on your toes" has been reached by the

hoofed mammals, especially the horse family. One toe after another has been lifted off the ground, in the striving for ever greater speed and agility, until now the descendant of the once five-toed Little Eohippus runs his earthly course upon his middle toenails.

Then Bipeds

While some animals were getting up on their toes, others were going a point further, and getting up on their hind legs—and that is where we come in. The idea of biped locomotion seems to have been invented at several different times, and by several different groups of animals. Away back in amphibian times, frogs and toads went into the hopping business, which takes most of the job of legs for the hind members of the firm. There were plenty of biped dinosaurs, some of them among the biggest and fiercest of the flesh-eaters, like the tyrannosaur group. Birds are bipeds without exception. There are no end of two-legged animals among the mammals.

Two different lines of two-legged animals have been developed: the leapers and the runners. The two kinds turn up in practically all groups of animals. Frogs are typical leapers in the lower groups, kangaroos among the more top-lofty mammals. Tyrannosaurs were probably runners; ostriches and men certainly are.

This business of getting up on our hind legs has been an exceedingly important factor in our whole evolution. By lifting the forelimbs clear of the ground, the new posture freed them from the unremitting job of holding up the front end of the body, and gave them a chance to experiment with all kinds of other things: stuffing food into the face, slugging your enemy or making love to your mate, or just "monkeying around" with a stick or stone and thus beginning the endless inquisitiveness into "what's this good for?" that is the ultimate basis of all science and all invention.

Then the Face

So long as our front feet stayed on the ground, our eyes could not be lifted to the heavens. We were too busy putting our snout down, feeding on grass like Nebuchadnezzar. Once we stood up and stayed up, we could "pull in our nose" and develop something more like a real face. We could get our eyes around in front and look at things out of both of them at once. With the re-



VALUED

In the fields of sport and entertainment, human legs are recognized important assets—not just taken for granted as they are in everyday life.

orientation of our head bones, we could grow a brain able to answer the endless questions shot at it by our endlessly "monkeying" hands.

There are a whole lot of things we have to thank to our legs.

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Science News Letter, February 22, 1936

CHEMISTRY

Fireproof Wood Approved By Fire Underwriters

FIREPROOF lumber—dream of man since the ancients suggested soaking timber in vinegar to prevent burning—is at last a reality.

The laboratories of the National Board of Fire Underwriters in Chicago have placed their seal of approval on chemically treated red oak and maple, which cannot be burned in a practical sense and is an obstacle to the spread of fire instead of path for its travel.

"Practically noncombustible and non-flammable" is the verdict of the laboratory after months of testing in real fires and under rigidly controlled conditions.

Walls and floors of the fireproof wood act as fire-stops, prevent the passage of fire and confine a conflagration to its point of origin.

The approval report also notes that the fireproofing properties last throughout the life of the timber.

The successful fireproofing is effected by a method not unlike that used in the treatment of telegraph poles, railroad ties, fence posts, etc., with creosote for protection against decay, except that incombustible salts are used in the case of the fireproofed lumber. The technique of the process is exacting, as its success depends largely upon getting just the correct amount of salts into the wood as a greater or lesser amount fails to give the desired results. Protexol Corporation of Kenilworth, N. J., is the manufacturer.

Properties of the fireproof lumber other than its fire-resisting qualities were also investigated. Its workability was found to be equal in every way to that of untreated lumber. Its ability to take paint and varnish is not altered, its appearance is unchanged and its weight is only slightly greater than that of untreated material.

In the tests conducted at Underwriters' Laboratories actual fire conditions were created. Whole floors of the fireproofed lumber, and others of untreated lumber, were subjected to a roaring inferno in gas-fired furnaces especially designed for such work. Through windows the behavior under fire of the fireproofed and the untreated floors was observed and compared by one group of engineers, while a hundred feet away other engineers recorded the temperatures of the floors by means of meters connected with thermocouples.

The fireproofed floors came from the furnace at the completion of the tests blackened and charred on the exposed surface but intact and otherwise sound, having successfully stood as a barrier against the fire.

Test floors were repeatedly washed to determine the lasting quality of the fireproofing. For thirty days an automatic machine scrubbed them with cleaning compound, flushed with clear water and dried the surface every thirty minutes.

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• RADIO

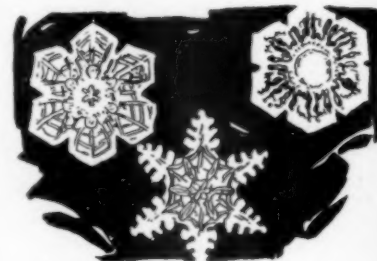
February 23, 3:15 p. m. E.S.T.

WEATHER — WHETHER OR NO —
Dr. W. J. Humphreys of the United States Weather Bureau.

March 3, 3:15 p. m., E.S.T.

PLANT GROWTH SECRETS — Dr. P. W. Zimmerman of the Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.



Miracles of Unlikeness

See Front Cover

SNOW has fallen over wide reaches of our country; deeper than it has lain for years it now lies from Washington to Maine, from the Canadian border to the Ohio. A cold wave of record-breaking length and intensity brought it and piled it up, and continued cold kept it from melting away. Lighter than feathers by the handful, in the aggregate it totals a tonnage that can be expressed only in figures of astronomical magnitude.

And if the total number of tons of snow is almost beyond calculating, what shall be said of the total number of flakes? Each so tiny that it can just be seen with the naked eye, so light that its weight will hardly disturb the most delicate of scientific balances, the numbers of these tiny white bits of frozen water, even on a square mile or an acre, let alone more than half a continent, simply baffling any attempt at imagining.

Yet it is highly probable that each separate flake that has fallen all winter, or in all past winters since the world has known snow at all, has been absolutely unique, wholly without an exact twin anywhere or at any time.

It is not possible, to be sure, to make a categorical denial that any two snowflakes ever have been alike. That would mean that one would have to take every snowflake that has ever fallen and compare it with every other snowflake—a feat impossible to the limits of absurdity.

But it is possible to assert, with the records all in your support, that nobody ever found a snowflake exactly like any

other snowflake. Thousands of people have looked at them, more or less closely, all the way from the casual wayfarer who glances at them as they fall on his coatsleeve to the more scientific-minded person who carries a magnifying-glass and holds his breath while he peers at them, lest he melt his "specimens" under his very nose.

Thousands of persons have thus looked, and a few have had the patience and skill to make photographs. Notable

among snow photographers was a Vermonter, the late W. A. Bentley. Among his many hundreds of snowflake plates there are no duplicates, not even any two that look particularly much alike. The number of snowflakes is infinite; their variety likewise infinite.

The cover photograph shows the unusually heavy fall in Washington as seen at night at the gate of the Japanese embassy by the camera of Fremont Davis, Science Service staff photographer.

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PHOTOGRAPHY

Snapshot Prints in Color Now Within Amateur's Grasp

IN A second story room of a house in Philadelphia, tables covered with notes and chemicals, walls decorated with photographs in color, microscopes and books mixed side by side in cases, a worn chair by the radio, a little old man now enters his 81st year convinced that color photography is within the grasp of the amateur at last.

Exceptionally keen of mind, this man has probably done more than any other to revolutionize the printing arts within the last half century, for he is Frederic Eugene Ives, the man who made the half tone and color reproduction available to newspapers and magazines.

Asked whether or not color photography would soon be within the grasp of the amateur, Mr. Ives pointed to the splendid examples hanging on the walls of his laboratory-study. Each of these had been done by an amateur, and the specimens sent to the inventor. Mr. Ives now devotes his time to giving information to amateurs and giving them advice regarding their problems. Under his kindly guidance not a few have been able to reproduce prints in natural colors using no special camera, but whatever camera the amateur might own. At a cost of about twenty-five cents per print many amateurs have achieved results that rival paintings.

Printer at 17

The snow storm raging outside reminded Mr. Ives that it was during such a storm that he was born on an New England farm. In fact it was a whole week before a doctor could battle his way through the snow drifts. His father died before he was twelve years old, and before he was seventeen he was a graduate printer working in Ithaca. So it will

be seen that Mr. Ives early became familiar with the graphic arts of the time. He was, from early boyhood, an amateur photographer and one of his first resolutions was to wed the arts of printing and photography.

At the age of eighteen he applied to Cornell University for the position of photographer, and Prof. Anthony, after some misgivings because of his youth, gave him the position. Here Mr. Ives made the experiments which were later to develop into the half-tone process.

Met Opposition

At Cornell Mr. Ives perfected the swelled gelatine and relief method, and used it for two years in illustrating the college paper, "Cocagne." Mr. Ives then went to Baltimore to carry his process to a short-lived illustrated weekly, and later came to Philadelphia. Naturally his processes met with opposition from the wood engravers, who saw the end of their usefulness in the newspaper field.

Later Mr. Ives also perfected his color reproduction processes. It would be difficult today to imagine a newspaper without half tones, or a magazine without color plates.

Mr. Ives disclosed for the first time the fact that the shortsightedness of Thomas Edison's business managers probably held back the production of colored motion pictures many years.

Edison and Mr. Ives knew each other very well. The great inventor discussed colored motion pictures with Mr. Ives and then turned the matter over to his business managers. These astute gentlemen would not consider Mr. Ives' research because it was not perfected at the time. Strangely enough, the recent advent of color photography found

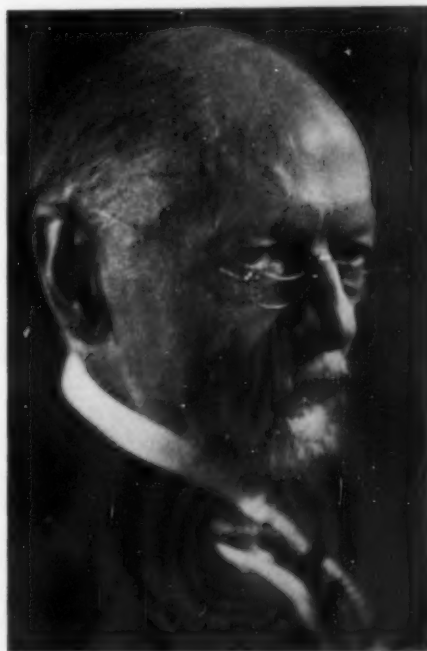
many of Mr. Ives' expired patents used as a basis for new color films.

One of the first specimens of Mr. Ives reproducing process appeared in Godey's Lady's Book in 1881, and by 1886 the half tone screen made its appearance in his work. Not only did the introduction of the half tone process make photographic reproduction possible in newspapers, but it revolutionized the printing of dailies since dry, instead of wet, paper was used, and a better ink was necessary.

Mr. Ives is now devoting his entire time to the explanation of his simple three-color process of color photography. No elaborate equipment or cameras are necessary. Two plates are used, face to face, in any camera. These plates are developed. From one a blue print is made. From the other a film is made that is treated with certain dyes. The second film is placed over the blue print and a finished print, since the two adhere to each other, is obtained. It is possible to make as many prints, and covering films, as desired from the two plates. The resulting print is a thing of beauty and a faithful reproduction.

Mr. Ives derives great pleasure in his personal contacts, and correspondence with amateurs, and looks forward to seeing his simplified color photography used by the many thousands of camera enthusiasts throughout the world. Free use of his patented Polychrome process is his birthday gift to amateur photographers.

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FREDERIC EUGENE IVES

•First Glances at New Books

Astronomy

LET'S LOOK AT THE STARS—Edwin B. Frost—*Houghton Mifflin*, 118 p., \$2. The late Prof. Frost was to the glory of the heavens as Beethoven was to the splendor of music; for he was blind. Yet he possessed to a remarkable degree the power of unsealing the eyes of the rest of us, who look, yet do not see. In this, his last work, he performs the task where it will probably profit most—the book is done for children. He tells his tale with all the direct simplicity of a wise man who knows how to talk to children so that they will not stop listening. The book is beautifully printed, illustrated, and bound; Prof. Frost could not have wanted for a better monument.

Science News Letter, February 22, 1936

Chemistry

SULFURIC ACID MANUFACTURE—Andrew M. Fairlie—*Reinhold Pub. Corp.*, 669 p., \$9.75. A new volume of the American Chemical Society Monograph series which stands midway between elementary treatises and the elaborate three and four volume sets by English and German authorities. Designed as a reference work for the chemical engineer, the technical chemist, the acid manufacturer or the chemical engineering student, the book compresses approved modern practices into a compact form.

Science News Letter, February 22, 1936

Medicine

THE DANGEROUS AGE IN MEN—Chester T. Stone—*Macmillan*, 105 p., \$1.75. This is a simple, matter-of-fact explanation of the prostate gland, its functions and diseases. Advice on how to avoid some of these diseases and a brief discussion of modern methods of successful treatment are given. The lay reader can find in this small volume the answers to many troublesome questions and knowledge of how to protect himself against many serious conditions.

Science News Letter, February 22, 1936

Natural History

A CHILD'S STORY OF THE ANIMAL WORLD—Edward G. Huey; Illustrated by H. R. Daugherty and Olive Earle—*Reynal & Hitchcock*, 355 p., \$3.50. A good big book about animals, written in short sentences of words that should be in every young child's vocabulary, and well filled with halftone and line illus-

trations. Most of the text consists of animal-by-animal accounts, which is as it should be, but there are also chapters on such grown-up topics as ecology and evolution, trimmed down to fit the scale of the rest of the book.

Science News Letter, February 22, 1936

Entomology

OUR ENEMY THE TERMITE—Thomas Elliott Snyder—*Comstock*, 196 p., \$3. Termites have created a good deal of consternation lately, even in places where they have long existed but where public notice has not hitherto been taken of them. This book, the work of a leading scientist in the Bureau of Entomology, U. S. Department of Agriculture, will perform the valuable double task of telling the public just what termites are and what mischief they do, and of setting a reasonable limit to justified alarm.

Science News Letter, February 22, 1936

Photography

U. S. CAMERA, 1935—Edited by T. J. Maloney—*Morrow*, 192 p., \$2.75. A photography book decidedly above the average in quality, both in selection and depiction of material and in the workmanship of engraver and printer. One section is devoted to scientific photography; many of the pictures in other parts of the book are of scientific or technological interest.

Science News Letter, February 22, 1936

Industrial Engineering

MECHANICAL PROCESSING OF COTTONSEED—W. R. Woolrich and E. L. Carpenter—*Engineering Experiment Station, Univ. of Tenn.*, 154 p., \$1 paper, \$2 cloth. Outline of the cottonseed oil industry, including history, economics, and detailed fabrication methods from the cotton boll to the consumer.

Science News Letter, February 22, 1936

Industrial Chemistry

RAYON AND SYNTHETIC YARN HANDBOOK: Second enlarged ed.—E. W. K. Schwarz and Herbert R. Mauersberger—*Rayon Pub. Corp.*, 558 p., \$3.75. A reference book, for the use of the industry, that gives much information about manufacturing methods. Two interesting chapters cover the dry cleaning and laundering of rayon and synthetic fabrics.

Science News Letter, February 22, 1936

Geophysics

HOT SPRINGS OF THE YELLOWSTONE NATIONAL PARK—E. T. Allen and Arthur L. Day—*Carnegie Institution of Washington*, 525 p., 215 illus., paper \$5.25, cloth \$6. This is a book really deserving of the use of the somewhat overused term, monumental. It has long been awaited by geophysicists and geologists, and it will not disappoint them. The authors spent several years in careful investigation of the thermal phenomena of the Yellowstone region, and several more in digesting and preparing their results. No datum was taken for granted; no theory accepted without thorough re-testing. The outcome is a work that at a stroke renders all previously existing general discussions archaic. This becomes the sourcebook of Yellowstone Park geyser and hot-spring information.

Science News Letter, February 22, 1936

Anatomy

AN INTRODUCTION TO HUMAN ANATOMY—Clyde Marshall—*Saunders*, 385 p., \$2.50. A compact textbook, written with the aim of stimulating the student's interest as well as presenting him with the essential facts of human anatomy. For students of elementary anatomy, but too technical for lay reading.

Science News Letter, February 22, 1936

Juvenile Literature

AT THE ZOO—Arthur O. Cooke—*Platt & Munk*, 152 p., \$1. An animal book for very small children who still need very big print. There are lots of pictures, both colored and plain. All round, a very considerable amount of book for a dollar.

Science News Letter, February 22, 1936

Entomology

INSECT ENEMIES OF SHADE-TREES—Glenn W. Herrick—*Comstock*, 417 p., \$5. Trees planted for shade and ornament are more valuable per individual, even on a cold cash basis, than any others. For this reason, damage or death through the attack of insect pests is of peculiar importance in their case, so that it profits entomologists, foresters and administrators to know something about their special problems. This book tells, with authority and completeness, the essential facts in this particular field.

Science News Letter, February 22, 1936

Demography

HUMAN ECOLOGY—J. W. Bews—*Oxford*, 312 p., \$5. Recognition of man as a natural organism living, as do all other organisms, in constant response to factors in the environment, is effecting a fusion between human sociology and economics, and the corresponding biological science of ecology. In this book, Prof. Bews critically examines the importance of factors that impinge on human existence: food plants and animals, and the climate, soils, diseases, etc., that affect them; diseases that attack man and their furtherance or hindrance; geographic and biotic factors; many other problems of this kind. Man's practical uniqueness, in being able to control in some measure his own environment, is not neglected. A most significant book.

Science News Letter, February 22, 1936

Chemistry

CHEMISTRY GUIDE AND LABORATORY EXERCISES WITH ACCOMPANYING TESTS—M. V. McGill and G. M. Bradbury—*Lyons & Carnahan*, 374 p., 75c. Chemistry Unit and Review Tests to accompany above, 56 p. A high school caliber text in elementary chemistry with tests and review of the true-false type. Chemistry instructors will find their work greatly lightened by the arrangement of the material presented.

Science News Letter, February 22, 1936

Agriculture Economics

HAWAII, A PAGEANT OF THE SOIL—Jean Hobbs—*Stanford Univ. Press*, 185 p., \$2.50. The gods of the fire-mountains made Hawaii, and gave to the islands one of the best soil complexes in the whole fruitful subtropical world. The soil is Hawaii's only treasure, and the history of Hawaii has been a history of transactions attending this treasure, and of the struggles that attended these transactions. This book is a careful recounting of that history.

Science News Letter, February 22, 1936

Zoology

ZOOLOGY OF NEW ENGLAND, NEW YORK, NEW JERSEY AND PENNSYLVANIA—Anthony Curtiss—*Guide Printing Co.*, 256 p., \$2. Fourth edition of a valuable regional zoological guide.

Science News Letter, February 22, 1936

Animal Psychology

THE MIND OF THE DOG—F. J. J. Buytendijk—*Houghton Mifflin*, 213 p., \$2.50. Descriptions of many experiments designed to find out how a dog's mind works, by a leading Netherlands psychologist, ably translated into English

by Lilian A. Clare. The author's ideas on the workings of the animal mind are interspersed, here and there, with philosophical asides on the workings of the mind of the animal's master. Not only comparative psychologists, but all dog-lovers (and who isn't one?) will read this book with interest, and mayhap argue about some of the things in it.

Science News Letter, February 22, 1936

Natural History

HUNTING WILD LIFE WITH CAMERA AND FLASHLIGHT—George Shiras, 3d—*Nat'l. Geographic Society*, Vol. I—Lake Superior Region, 450 p., Vol. II—Wild Life of Coasts, Islands, and Mountains, 450 p., 950 photographs, \$5 per set. Shiras has ranged far and seen many things; he shows himself master of the photographer's art as well as of the narrator's; and the publishing Society does not lag behind him in its share of the task of presentation. Certainly, a book that should be in every library where there is interest either in wildlife or photography.

Science News Letter, February 22, 1936

Chemistry

THE CHEMISTRY OF SYNTHETIC RESINS—Carleton Ellis—*Reinhold Pub. Corp.*, 2 vol., 1615 p., \$19.50. An encyclopedic treatise on the chemistry and manufacture of the several thousand synthetic resins which are now used. One hundred and fifty-six pages of the finest type are required for the subject index alone, and this indicates the magnitude of the volumes' scope.

Science News Letter, February 22, 1936

Ornithology

THE NATURE OF A BIRD'S WORLD—Eliot Howard—*Cambridge (Macmillan)*, 102 p., \$2.50. It is hard enough for us to think in terms of the psychology of dog, rat, rabbit or guinea pig; but these are nevertheless mammals—our kin; how are we to get inside a bird's feathers and guess how its mind works? This, nevertheless, is the heroic task which the present author has set for himself; and the resulting survey of things that are significant to birds, and of what may motivate them in their reactions to these things, is in many places illuminating, and always provocative.

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Gardening

FLOWER GARDEN PRIMER—Julia H. Cummins—*Macmillan*, 333 p., \$3. Of the making of garden books there is no end, and one wonders, on the appearance of each one, how it is ever going to make a place for itself in the already apparently overcrowded field. However, of the making of gardens there has also been no end, since the days of Great-grandfather Adam, and the books do seem to strike root and take hold. This one will, without much question; it is easily and flowingly written, and contains a lot of practical information. It makes gardening look so attractive that it might even lure a lazy husband off the couch to help an industrious wife!

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Engineering

TRANSACTIONS OF THE HYDRAULIC INSTITUTE OF THE MUNICH TECHNICAL UNIVERSITY, BULLETIN 3—Ed. by D. Thoma—*American Society of Mechanical Engineers*, 116 p., \$3.75.

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Statistics

STATISTICAL PROCEDURES AND THEIR MATHEMATICAL BASES—Charles C. Peters and Walter R. VanVoorhis—*Pennsylvania State College*, 363 p., \$1.50.

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Geology

THE AMAZING STORY OF MAINE—Leon Harold Tebbetts—*Falmouth Book House*, 104 p., \$2.50. There is plenty of geology in Maine, as farmers of that state know to their annoyance, but vacationists to their joy. This book, which tells the story of the rocks of Maine from the Archaean until now, will help to a better understanding, and therefore to a better appreciation, those who dwell or sojourn along the Maine coast or among the Maine mountains.

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Astronomy

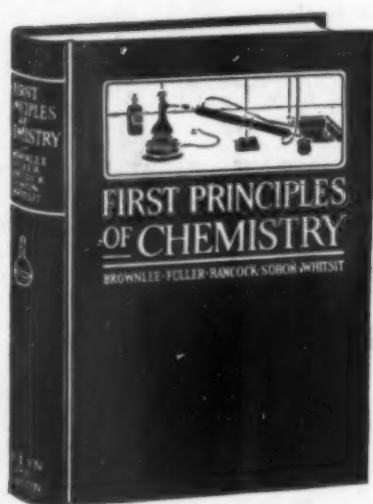
THE EARTH AMONG THE STARS—Marian Lockwood and Arthur L. Draper—*Basic Books*, 91 p., 35c. In spite of its small physical compass, this pocket-sized volume manages to catch and convey an impression of the breathless immensities of space and the stars that swim therein.

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THE WORLD OF CHEMISTRY

WE LIVE our lives amid material things. To the understanding of this environment man has given centuries of toil and thought. Slowly superstitions have given way to scientific facts. Great minds have delved in obscurity to bring forth scientific principles. When these were numerous enough and became properly classified, the sciences of today came into being.

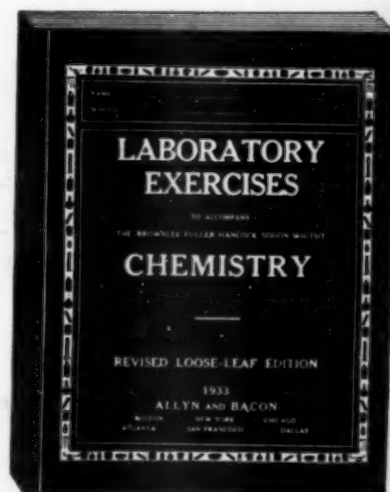


The pathways to the sciences were not dull and humdrum, for along the road lay adventure, romance, and even tragedy. Ever the scientist sought the truth. Always he regarded his labors as vain unless he gave a better understanding of the world about him and turned his discoveries to the service of mankind.

Chemistry offers a rich field to the inquiring mind and brings great reward to those who understand its teachings. It is of constant practical value. It tells how to select proper materials for every kind of construction. It has rendered available many metals and special alloys that make our trains, automobiles, and airplanes more serviceable. It has made the soil more fertile and has revealed the nature of our food. It shows us that the human body is a living chemical laboratory, and that even thought has a chemical basis.

The modern textbook in chemistry reflects its history, spirit and service to mankind. It is not a mere epitome of facts—scientific principles serve as luminous guides along the course the learner must take. Vivid illustrations and simple language make clear the practical applications of science. There is careful selection of valuable topics properly grouped. There are devices for testing the learning of the student in accord with modern educational practice.

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Best of all, the study of chemistry in this modern manner trains the mind in straight, honest thinking—the true preparation for facing the realities of the present day.

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